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GEOGRAPHY IN AMERICAN UNIVERSITIES

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INTRODUCTION

THE purpose of this paper is to show, by means of certain statistics, something of the growth of geography in our state universities. A few of the leading endowed universities are included in this report, chiefly for the sake of comparison.

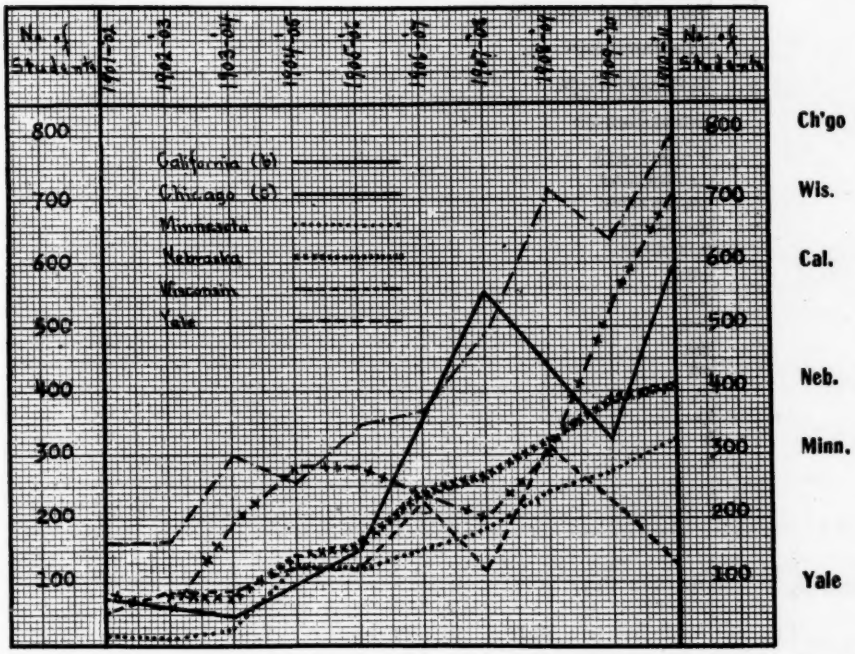

DIAGRAM A. Showing the total annual enrollment in Geography in some typical universities during the ten-year period, 1910-1911, for collegiate year only.
(b) Figures available for alternate years only.
(c) The figures for Chicago include summer quarter also.

The term geography as here used, includes only the courses taught in the departments of Geography, or Geology and Geography; this excludes courses in geography given in the departments of Economics, History, etc.

This has been done because it would be well-nigh impossible to draw the line as to what constitutes geography, for, a course that one university, Yale, for instance, calls *Anthropo-geography,* taught in the department of Geography, another institution, Minnesota, for instance, calls *Anthropology,* and is offered as such in the department of Sociology and Anthropology. The same holds true in certain courses in economics; what a man in such a department calls *economics,* another would designate *commercial geography.*

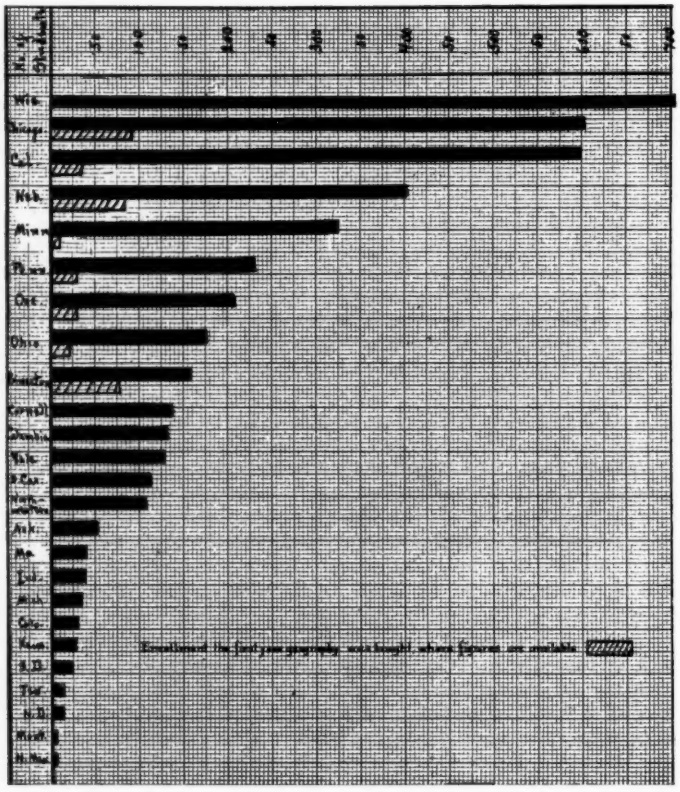

DIAGRAM B. Total Enrollment in Geography in American Universities during the collegiate year of 1910-1911.

The material for this paper has been obtained from four sources: (1) the heads of departments of Geography, or Geography and Geology; (2) university presidents; (3) the official registrars; and (4) the annual catalogs and special announcements of geography courses of the various universities of the country.

GEOGRAPHY IN THE UNIVERSITIES

Geography is taught today in twenty-four out of the total forty state universities, as well as in most of the leading endowed universities of the

United States. A glance at Table I, shows that the institutions where the subject is not taught are among the smaller ones, at least as far as the number of students enrolled is concerned. A very few of our universities have distinct and independent departments of geography, (see Table II);

Table I. Universities Offering Geography Courses in 1910-1911

Universities giving Geography	Year it was introduced	Universities giving no geography
Arkansas	1910-11	Alabama
California (a)	1898	
Chicago (a)	1892	Arizona
Colorado	1910	
Columbia	1896	Florida
Cornell (a)	1868	
Harvard (a)	Prior to 1841	Georgia
Illinois		
Indiana	About 1886	Idaho
Iowa	About 1906	
Kansas (a)	About 1901	Kentucky
Michigan	1907-08	
Minnesota (a)	1900-01	Louisana
Missouri	About 1895	
Montana	1904	Maine
Nebraska (a)	1902	
New Mexico	1910-11	Mississippi
North Carolina (a)	1892	
North Dakota (a)	1908-09	Oklahoma
Northwestern (a)	About 1890	
Ohio (a)	1902	Nevada
Oregon	1909-10	
Pennsylvania	1902	Utah
Princeton (a)	1854	
South Carolina	1905	Vermont
South Dakota	1909	
Tennessee	1907	Virginia (b)
Texas	1904	
Washington		West Virginia
Wisconsin (a)	1868	
Yale (a)	Prior to 1872	Wyoming

(a) Universities giving graduate work in geography.
(b) Geography courses offered in Summer School.

some, however, have independent departments of geography in everything except in name; such institutions are: Wisconsin, Harvard, Yale, Cornell, Minnesota, Northwestern, and Pennsylvania. Most of the universities offer their work in geography in connection with the Department of Geology.

To Harvard belongs the distinction of being the pioneer and leader in introducing the subject of geography into American universities, having done so prior to 1841; Princeton followed suit in 1854, and Cornell in 1868. Yale taught the subject several years prior to 1872. The state universities did not fall into line until within the past two decades, (see Table I); Wisconsin, however, is an exception to this rule, as geography was taught there as early as 1868.

Table II. Showing with what department Geography is affiliated.

Universities having independent department of geography	Year when made independent	Universities having geography affiliated with the department of geology	
		Arkansas	North Carolina
California	1898	Colorado	North Dakota
		Cornell (a)	Northwestern
Chicago	1903	Harvard	Ohio
		Illinois	Oregon
Columbia	1896	Indiana	South Carolina
		Kansas	South Dakota
Cornell (a)	1894	Michigan	Tennessee
		Missouri	Texas
Nebraska	1906	Minnesota	Washington
		Montana	Wisconsin
Princeton	1883	New Mexico	Yale

(a) Separate department of physical geography during three periods, but now part of department of geology.

That there is a growing demand for geography in American universities may be seen from the fact that today twenty-four state universities offer courses in geography, whereas in 1901 only five of them did so. The same story of growth is told in Table III and Diagram A, which show the total enrollment in several typical universities, both state and endowed institutions, during the ten-year period, 1901-1911.

Table IV and Diagram B, may be of greater interest, since they show the total enrollment in geography in all the state universities offering the subject in 1910-11. Whenever the figures were available, the enrollment during the first year that geography was taught in individual institutions is indicated (see Table IV and Diagram B.). These also give one somewhat of an idea of the growth of the subject.

As has been mentioned above, twenty-four of the state universities gave courses in geography during the collegiate year 1910-11, and two additional universities offered the subject in summer school. Most of this

work is necessarily elementary in character, but nine of the state institutions, and six of the endowed universities (included in this report) offer graduate instruction in the subject (see Table I).

Table III. Showing the Annual Enrollment in Geography in some typical American Universities, during the ten-year period 1901-1911 (a)

Year	1901 1902	1902 1903	1903 1904	1904 1905	1905 1906	1906 1907	1907 1908	1908 1909	1909 1910	1910 1911
California (c)	77		47		150		556		328	592
Harvard				(Figures not obtained)						
Chicago (b)	165	164	297	252	345	365	488	718	631	796
Minnesota	18	11	30	124	125	151	178	247	273	325
Nebraska		78	71	140	157	234	269	318	376	407
Wisconsin	87	56	193	281	283	238	201	304	535	704
Yale	52	87	86	124	120	227	119	313	229	129

(a) Figures show sum total enrollment for collegiate years only. Summer School enrollment not included, excepting in the case of Chicago.

(b) These figures include Summer Quarters.

(c) Figures available for alternate years only.

An attempt has been made to classify these courses, and to give the number of universities offering same, (see Table V), but it is rather difficult to group these subjects to the satisfaction of all. The plan followed in Table V is to group under one head such courses as from a careful study of the description in the catalogs and announcements, seem to cover the same field. Thus, physical geography and physiography, though both

are given in some universities, seem to cover practically the same ground; the same may be said concerning commercial, economic, and industrial geography; hence, these will be grouped together.

Table IV. Enrollment in Geography in American Universities in 1910-11, and during the First Year it was Taught. (a)

Name of University	Enrollment in 1910-11	Year when first taught	Enrollment during the first year
Arkansas	53	1910-11	53
California	592	1898	35
Chicago	607	1892	85
Colorado	31	1910	31
Columbia	131	1896	
Cornell	137	1893-94	14
Harvard		Prior to 1841	
Indiana	40	About 1886	
Kansas	28	About 1901	
Michigan	36	1907-08	13
Minnesota	325	1900-01	11
Missouri	40	About 1895	
Montana	5	1904	
Nebraska	407	1902	78
New Mexico	5	1910-11	5
North Dakota	14	1908-09	3
Northwestern	107	About 1890	
Oregon	207	1909-10	29
Pennsylvania	260	1902	30
Princeton	160	1854	79
South Carolina	113	1905	
South Dakota	25	1909	15
Texas	15	1904	
Wisconsin	704	1868	87(b)
Yale	129	Prior to 1872	

(a) Where no figures are given, or a university is omitted, data were not available.

(b) Enrollment in 1901. Figures for 1868 not available.

From this Table V, we find that physical geography or physiography is taught in twenty-eight out of the thirty-one universities listed in this report; no less than twenty-one state universities offer the course. Meteorology, regional geography, and climatology come next, with 15, 13, and 12 institutions respectively giving the same. That the universities are trying to better the geography instruction in our secondary schools may be inferred from the fact that ten of them offer teachers' courses in geography. This does not include those courses in summer schools especially

Table V. Names of Geography Courses given in American Universities during the year 1910-1911. (a)

Names of geography courses	Number of universities giving same
Anthropo-geography	2
Commercial, Economic, & Industrial Geography	10
Conservation of Natural Resources	3
Climatology	12
Field Work & Laboratory Practice	5
Geographic Influences; Man and His Environment	5
Glacial Geography	4
History of Geography	1
Historical Geography of American Cities	1
Introductory or General Geography	5
Map Study, Map Making, Relief Modelling, etc.	4
Meteorology	15
Oceanography	3
Physical Geography; Physiography	28
Political Geography	2
Principles of Geography	1
Regional Climatology	2
Regional Geography	13
Regional and Experimental Physiography	7
Research, Seminar, Problems, Thesis, etc.	9
Teachers' Courses	10

(a) These do not include Summer School courses.

designed for teachers, who spend a part of their vacation at our higher institutions of learning.

The number of students enrolled in geography in different universities, as shown in the succeeding tables and diagrams, gives one but a limited idea of the relative strength of geography in the respective institutions. The amount of time given the subject in different universities, though approximately the same throughout the year, calls for some explanation. In the University of California, for instance, the courses are two- and three-hour courses (per week), covering a period of half a year, whereas those of the University of Chicago, are four- and five-hour courses running twelve weeks. At the University of Wisconsin, on the other hand, where ten hours a week, for a period of half a year, are devoted to one elementary course, such as physiography, it is readily seen that the work covered in such a course equals that given in two or more courses offered in another institution, where but two or three hours per week, for the same length of time, are given to the subject.

Though many courses in geography of the same name are given in the various universities, it does not follow that the amount and kind of work given in these courses are identical. Nor does it necessarily follow that those institutions that give a greater number of courses in the subject are covering a wider scope than those offering numerically fewer courses; for, as has been stated above, partly due to the different systems of dividing the school year into quarters, terms, and semesters, and partly due to other causes, the amount of time given a subject and the amount of work done in a given time varies in different institutions.

THE PRECIOUS METALS AS A GEOGRAPHIC FACTOR IN THE DEVELOPMENT OF THE UNITED STATES*

A Summary by GEORGE D. HUBBARD,
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IN the preparation of this dissertation, the purpose has been to set forth the evidence and the extent of the geographic influence of the precious metals in the development of the United States. If undue emphasis has seemingly been given to the geographic influences, it may be simply because all other classes of influences and their effects have been disregarded for the time. This lack of attention to economic, social and other forces has not been through a lack of appreciation of their importance or a desire to detract from their interest, but because of the purpose to make clear and to emphasize the influence of gold and silver growing out of their geographic distribution and geographic associations and relations.

Care has been taken to pursue the investigation along each line as far as the evidence will allow; and caution has been used to prevent drawing unwarranted conclusions. The facts that various other causes produce similar results, and that several causes operate together to bring about a single result have often complicated the problem. After certain results have been noted, an examination of other classes of influence—economic, social, religious, historic, and racial—has been made to determine which cause has been effective, or which should be considered more important. Occasional-

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*Under this general title there have appeared a series of articles dealing with several phases of the question. Together they constitute the thesis presented by the author to Cornell University for the degree of Doctor of Philosophy. The papers may be found as follows:

Scott. Geog. Mag. Vol. XXVI (1910) pp. 449-466.
Bull. Amer. Geog. Soc. Vol. XLII (1910) pp. 594-602.
Scott. Geog. Mag. Vol. XXVII (1911) pp. 417-26, 470-74.
Bull. Phil. Geog. Soc. Vol. IX (1911) pp. 1-22.
Bull. Phil. Geog. Soc. Vol. X (1912) pp. 36-50.
Bull. Amer. Geog. Soc. Vol. XLIV (1912) pp. 97-112.

ly, in testing the power of the influence of any set of conditions, or the degree of the responses to them, it has been found helpful to suppose changed conditions, and note results. This device cannot be considered final, because one is never sure what would happen under hypothetical conditions; nor can he be certain that he has taken cognizance of all conditions.

An attempt has been made to discover the essential principle in each case, because items alone are of little value except as they lead, or point to, or illustrate the principle. Some of the principles deduced in the study may be set forth as follows:—

Mining processes have responded to the character of the ore and the nature of the geographic environment. In so far as the methods of mining and reduction, and the apparatus used, are adapted to the requirements of the ores and the conditions, they are successful; while a failure to conform is the signal for their defeat and disuse.

Spanish exploration and conquest were impelled and directed largely by the desire for treasure, and the scattering of the Spanish in search for it was a cause for their undoing; while English exploration and possession was not much affected by the presence of gold and silver within the territory which was left. Gold in California and other Western States has led both directly and indirectly to their exploration; and by this means not only have precious metals been discovered and possessed, but many other and more valuable resources have been found, and extensive scientific exploration has been carried on.

Spanish migration and settlement were largely for the purpose of acquiring the discovered gold and silver. The quest led them to wander all over South and Central America; however, during the early centuries they established but few organized agricultural settlements; hence their foothold on American soil was not permanent. The great exodus in 1849 and following, from the Atlantic Coasts, both European and American, was a tremendous wave of migration, and was impelled by the glamor and presence of gold in our West. The working out of the routes, the sustaining of hardships and the distribution of the people were in part responses to the influence of gold and silver; and these responses were what they were, because the precious metals were where they were. Many local migrations and minor effects on the people accrue to the influence of the metals.

The position, size and shape of camps as well as their character, are responses to the presence and distribution of the ores. Besides camps, commercial and outfitting towns, and later, extensive milling towns arose in response to the need for such settlements. Many other towns, less closely related to the industry, were stimulated by the presence and production of gold and silver. Most, if not all, Western towns are other than they would have been had the metals not been in their States. And, further, this in-

dustry will continue to influence towns as long as its extensive operation continues. Old towns, now active, will decline and new ones arise, as deposits become exhausted, and new ones are found.

Metallurgical and all reduction processes, as well as the mining itself, use the products of other industries; hence, manufacturies of shovels, mining machinery, milling apparatus, and chemicals required in the processes are all more or less stimulated. Further, the products of gold and silver mining contribute to other industries, and have thereby encouraged the manufacture of jewelry and many works of art as well as of coin. Agriculture, first hindered, has been greatly aided; all means of transportation have been called into use in one place or another, and their facilities developed far in advance of the stage they would otherwise have reached in the West. Education in mining, chemistry, and metallurgy, as well as in the making of mining machinery, has been greatly stimulated.

The industry of gold and silver mining and reduction has called into existence, in the West, volumes of laws and cases, covering the various kinds of mining and mining claims, and controversies arising from the clashing of opinions or misunderstandings concerning them. Local laws vary as do local geographic conditions. Many camp laws and regulations were somewhat generalized and carried up to district, county, and even to state codes, until the constitutions of most of the mining states have sections or articles relating to mining.

Regions containing extensive mining camps and, consequently, having a considerable population were organized into small counties, while territory possessing little or no mining was later lumped into large counties. Questions of national policy and conduct in the West have been hurried to crises by the presence and development of the ores. International relations have been strained by conditions arising under the influence of the metals, and consequent agreements have been entered into.

Early Spanish trade was encouraged and modified by the use of the gold that the traders found. Local prices in mining regions rose, and through their stimulating effect, commerce or prices, in all countries contributing goods to the regions, responded; and, thus, the new metal aided greatly in the commercial and industrial expansion, struggling for expression in the middle of the last century.

Men's characters, under the feverish excitement of the early mining days, were strengthened in the directions of independence of thought and action, mutual helpfulness, business alertness and resourcefulness. Power to resist extravagance and improvidence seems to have been weakened. Desire to wander, speculate, and gamble increased. Exuberance of life and spirit, joyousness and good feeling were developed. Former characters were abnormally and unsymmetrically developed. Health was impair-

ed. Distinct types of character were found in the case of the speculator and prospector. Business, society and literature of the West have been colored markedly by the presence and abundance of the precious metals, until social tone and the Westerner's attitude toward various institutions is, in part, a response to the influence. World-wide social effects are found in the distributing and quickening influences of the miner's emigration, in the loss to society of strength and restraint incident on mining life, and in the enlargement of knowledge and extension of vision felt in every nation of the earth permeated by the subtle influence of the precious metals.

THE DEVELOPMENT OF PHYSIOGRAPHY IN AMERICAN TEXTBOOKS

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THE history of the development of physical geography textbooks seems to divide naturally into six periods:

(1) First Physical Geography Textbooks, 1848-1860.
(2) Ante-Maury-Guyot Period, 1860-1870.
(3) Maury-Guyot Period, 1870-1878.
(4) Post Maury-Guyot Period, 1878-1890.
(5) Period of Revival, 1890-1900.
(6) Recent Period, 1900-1910.

FIRST PHYSICAL GEOGRAPHY TEXTBOOKS, 1848-1860.

Much was done in bringing the subject before the public in the way of lectures and lecture courses given by such men as Guyot, Lyell, Agassiz and others. Guyot gave a course of lectures in Boston on *Earth and Man* or Comparative Physical Geography in its Relation to the History of Mankind. They were so popular that they were published at once in lecture style in 1848, and edition after edition followed. The views of Carl Ritter, which have put life and humanity into geography, are used by Guyot as the basis of still wider generalizations bearing on the earth and human history.

In the same year in London appeared a *Physical Geography* by Mrs. Mary Somerville. She seems to be the first to collect physiographical data and publish the same as a Physical Geography. It is evident that much labor had been spent upon its compilation. It contains an immense amount of data in geography, geology, and mineralogy. It was used to some extent at this time as a textbook. It is a good book but

not a good textbook because there is no correlation of subjects and there is too much of irrelevant subjects and extreme detail.

In 1850, appeared A. K. Johnston's *Physical Atlas,* also his *Dictionary of Geography;* both of them very valuable books, especially at this time. In 1852 the American Geographical and Statistical Society was founded. In their publications are found many articles on physiography. This was another means of bringing the subject before the public.

In 1855, Matthew F. Maury's *The Physical Geography of the Sea* was published. It has had marked influence upon the development of that department of the science and was the instigator of early and further research in the study of oceanography and meteorology. It was intended primarily for the improvement of navigation and commerce but it was also used as a textbook. Some of the theories put forward then, are now out of date; but Maury's sprit of enthusiastic research is a lesson for all time. Humboldt declares him to be the founder of a new and important science. Up to this time we on this side of the Atlantic had made but little advancement in this comprehensive science. We find considerable foreign influence in the early development of American text-books in physiography, principally through the works of Ritter, Humboldt, Lyell, Agassiz, Forbes and Mrs. Mary Somerville. The text-books of this period are: *Physical Geography* by Mrs. Mary Somerville, 1848; *Outlines of Physical Geography* by G. W. Fitch, 1855; *Physical Geography* by Rosina M. Lornlin, 1855; *Elements of Physical Geography by* C. S. Cartèe, 1855; and *Physical Geography* by D. M. Warren, 1856.

About 1855 there was a general demand, especially among teachers, for a text-book exclusively devoted to the subject and adapted to the use of schools. This induced Warren and Fitch, not scientists, to undertake the preparation of their books. The arrangement of their main subjects is the same: (1) land, (2) water, (3) air, (4) life. Warren's book is far superior to Fitch's and is even used to-day in a few districts. Meteorology is the best developed subject in Warren's text-book. Fitch's book is mainly general and descriptive geography.

Cartèe says that the pupil with no knowledge of geography gained by observation must commence by studying the physical features about his own home; also, if apparatus is essential in teaching physics and chemistry, it is certainly no less so in the science of physical geography. Thus we find him voicing the sentiments of the present physiographer and teacher even in those early days. His book is a little disappointing when you consider his principles of teaching the subject.

The arrangement of the main subjects is the same in Lornlin, Fitch and Warren, as is favored in our present text-books. These books contain much mathematical geography. The authors are compilers and not physiographers.

AUTE-MAURY-GUYOT PERIOD, 1860-1870.

It is a period of almost absolute quiet. The books of this period are *Lessons in Physical Geography* by Walter Wells, 1861; *Physical and Political Geography* by James Monteith, 1866.

MAURY-GUYOT PERIOD, 1870-1878.

This period is one of real activity in the development of physical geography as a school subject. It is a period of scientists who taught that there is a cause for the phenomena about us, that there are certain successive changes and that certain results follow as consequences.

The books of this period are: *Physical Geography* by M. F. Maury, 1873; *Physical Geography* by A. H. Guyot, 1873; *Physical Geography* by John Macturck, 1873; *Physical Geography* by John Young, 1873; *Physical Geography* by E. J. Houston, 1875; *Primer of Physical Geography* by Archibald Geikie, 1876; *Elementary Physical Geography* by Geikie, 1877; and *Physiography* by T. H. Huxley, 1877.

Physical Geography by Maury is stripped of dry detail and mere technicalities. The water and the atmosphere are particularly well developed, due to the author's wide research and practical experience on the sea. The book has a fresh, attractive style and is scientific. In every part of Guyot's *Physical Geography* a strict geographical view-point has been observed. It is simplified for the student who has not had training in the sciences. A good bit of his material is now found in our grammar grade geographies which include the elementary principles of physical geography. Geikie's *Primer of Physical Geography* is scientific, clear and interesting. Geikie's *Elementary Physical Geography* covers thoroughly the subject of physiography, dealing mainly with the broad elementary questions. It is written clearly and each subject is well developed. His book differs in being the first to discuss erosion. Huxley gave the substance of his *Physiography* in a course of lectures in London. He illustrated his method of presenting the subject by a concrete case, the basin of the Thames. He discusses the general character of the Thames River, the form of the surface which it drains, follows its waters to the sea and, by way of the atmosphere, back to the surface. He deals with rivers and rain as instruments of erosion; the sediment carried to the sea, stratification and the formation of rock. He shows how erosion is compensated by elevation of land (coast shelves, mountains, volcanoes,) and lastly the relation of organic life. Having fixed these conceptions of the general nature of the agents in modifying the crust of the earth, he takes up the other subjects.

The books of Geikie and Huxley, foreign writers, were in common use at this time as text-books in America. They are now used mostly as reference books. Guyot, Geikie and Huxley believed that the most advantage-

ous method is to make use of the common knowledge and experience of the pupils, and starting from this basis, to train them in habits of observation and scientific modes of thought and inquiry. Thus the observing faculty is exercised, the power of induction cultivated and the imagination kept constantly active.

The books of this period are thoroughly scientific. There is a better arrangement of material for school purposes with the addition of illustrations and maps as specific examples. There is an absence of useless detail. The subject is presented in a clearer and more attractive manner and in the character of a science rather than an assemblage of disconnected facts. Land, air and ocean are treated as parts of a grand whole.

POST MAURY-GUYOT PERIOD, 1878-1890.

This period is one of comparative quiet in the development of physiography text-books. The books of this period are: *New Physical Geography* by James Monteith, 1885; *Physical Geography* by Barnes, 1885; Revised Edition of Guyot's *Physical Geography,* 1885; *Physical Geography* by Appleton, 1887; *Eclectic Physical Geography* by Russell Hinman, 1888.

Monteith's *Physical Geography* is clear and the subject is presented in an interesting manner. It could also be used in the year below the high school. It is the first to contain relief maps.

Appleton's *Physical Geography* was prepared by ten men, each a specialist in the particular part of the text he wrote. The plan and mode of treating the different subjects are quite new, especially the section on life. The main trouble with such a book is that it lacks symmetry. The illustrations, maps and relief maps are good. This period closes with Hinman's *Eclectic Physical Geography.* The subject of life is too biological and not sufficiently physiographical and it lacks correlation. His descriptions, explanations and definitions are clear and concise.

PERIOD OF REVIVAL, 1890-1900.

This is not only a period of revival but one of growth as well. It is characterized by the work of scientists. For instance, rivers are discussed not simply as divisions of water, but as having a definite work to perform; mountains not merely as land masses of a certain altitude, but as regulators of rainfall; geographical position and climate of a country influence its industry and trade. The books of this period are: *Outline of Physiography* by H. R. Mill, 1892; *Elementary Physical Geography* by R. S. Tarr, 1895; *First Book of Physical Geography* by R. S. Tarr, 1897; *Physical Geography* by W. M. Davis, 1898.

The Realm of Nature or *Physiography* by Mill, has been reviewed by Shaler with reference to the use of American students. It contains good and carefully selected material. It is a book for the teacher's use, being too comprehensive and compressed for use by pupils.

For some time there has been a demand for a text-book that will present physical geography in its modern, scientific development as well as in an elementary form. The report of the committee of Ten on Physiography for Secondary Schools, appointed at the meeting of the National Education Association in 1892, expresses the sentiment of some of the leading physiographers and teachers of that time. It expresses great dissatisfaction with methods in use, and makes the most revolutionary suggestions. The most important sections of their report relate to the methods and means of presenting the subject in schools, and to the right order of development.

Many of the suggestions made by this Committee are incorporated in the books of Professor Tarr and Professor Davis. They are much better adapted to class use. The pupil is led to trace physiographical facts back to their causes and forward to their results, and their influence upon life. Both Tarr and Davis lay special stress on the development of the physiography of the lands and its influence upon life and civilization. Great progress has been made in explaining the forms of the land and it has become possible to classify and describe land forms with scientific accuracy. This is exemplified in the development of coastal plains by Davis. There is much new and valuable material in the way of illustrations, and there is the introduction of the block diagrams in explaining relief. Both Tarr and Davis urge that their books be supplemented by laboratory, and especially field work. Any text-book however good will be of little value unless the pupil's own observational powers are trained, whence comparison can be made and conclusions formed. In this period there is the introduction of the geographical journal, which is very important in bringing to the teacher the latest research; best methods of development and current literature.

The report of the Committee of Fifteen on Physical Geography, appointed by the National Educational Association in 1899, expresses the sentiment of leading physiography teachers at the close of the period. The Committee emphasizes three points that are of prime importance in the selection of a teacher: (1) The training of a teacher should have reached a distinctly higher grade in physical geography than that of the course to be given. (2) The training should include laboratory courses in physics, chemistry, botany, zoology and geology. (3) The teacher should have developed ability to take advantage of local phenomena.

RECENT PERIOD, 1900-1910.

This is also a period of scientists. There is a great advance in the evolution of text-books and in methods of teaching. Many of the suggestions made by the reports of the Committees of Ten and Fifteen are well along in the process of development, such as, laboratories, practical

field work, the discarding of irrelevant material, introduction of the laboratory manual, text-books that are thoroughly scientific and more time given to the study of the subject in the secondary school.

In this period we find physiography replacing geology in the majority of our high schools. Of the two subjects, the former is more interesting, more practical, more comprehensive and broader for the average pupil than the geology taught. The text-books of this period are: *Elementary Physical Geography* by J. W. Redway, 1900; *Physical Geography,* revised, by M. F. Maury, 1901; *Lessons in Physical Geography* by C. R. Dryer, 1901; *New Physical Geography,* revised, by E. J. Houston, 1901; *Introduction to Physical Geography* by G. K. Gilbert and A. P. Brigham, 1902; *Elementary Physical Geography* by W. M. Davis, 1892; *New Physical Geography* by R. S. Tarr, 1903; *Practical Physiography* by H. W. Fairbanks, 1906; *Physiography* by R. D. Salisbury, 1908.

Only a brief review of these books is needed as they are so recent that the majority of physiography teachers are familiar with them. Many of the text-books begin with the development of the lands. It is a splendid starting point because field work can be introduced almost immediately, and the pupil can observe for himself that the physical features of the earth are in process of continual change.

These books are rich in the material of illustration. The illustrations should be regarded as vital and should be studied and interpreted as carefully as the text itself. The study of them should be supplemented by diagrams, lantern slides, laboratory and field work. There has been much improvement in the development of diagrams, weather maps, relief maps and models. There is the introduction of contour maps for school study.

Our present authors say that their text-books, in order to be effective, must be supplemented by laboratory and field work. The use of the laboratory and field manual is becoming common.

NOTES ON CANADA

By EDWARD VAN DYKE ROBINSON,
University of Minnesota, Minneapolis, Minn.

THE Canadian Government has set apart a Rocky Mountain Forest Reserve extending from the United States boundary to some forty or fifty miles north of the latitude of Edmonton. The general plan was to include in the reserve only forest land, excluding all pieces of land suitable for agriculture, except such as were very small. The original Order in Council fixed the boundaries of the reserve largely by altitude. The engineers, however, found that much of this land was too high for forests and that there was a large area of country outside the boundary as fixed

by altitude which was suitable for forests. That the government has acted none too soon is evident from the fact that 80 per cent of the entire area north of Calgary is estimated to be burned over, and fully 60 per cent of the area south of Calgary has been similarly devastated.

Much has been written about the deep sea fisheries along the eastern shore of Canada, but comparatively little is known regarding the fisheries in the West. The Great Lakes in Canada, (as in the United States,) support an important fishing industry whose center is at Selkirk, a few miles north of Winnipeg. The fishing in Lake Winnipeg is mostly done through the ice in the winter. Holes are cut at intervals and large seines are dragged under the ice. Fishing is also carried on in the summer, but the catch is smaller, except in the case of whitefish.

The beet sugar industry has been established in Canada, there being now two beet sugar factories in Ontario and a third at Raymond, Alberta. Their combined daily capacity is 1850 tons. The Alberta factory encounters difficulty in securing an adequate supply of beets, as the farmers in that section prefer the production of grain, which requires much less hand labor. From the agricultural standpoint, sugar beets have the same advantage in Canada as in Germany, namely, that they do not have to compete with corn for the land.

Canada is still the largest exporter of cheese in the world, although the exports of cheese and butter have steadily declined for the last six years. One explanation of this decline is the shipment of cream from the Eastern provinces to Boston. Doubtless the growth of Canadian cities is a further factor in checking the exports.

The port of Halifax has been made the winter terminus for the Canadian Northern Railway. The port of St. John, N. B., which was chosen several years ago as the winter port of the Grand Trunk Pacific System has experienced a decided "boom," with the result that the population and business at the port are rapidly increasing.

In the Klondike region along the Yukon, placer mining by individuals has practically given way to dredging. A new dredge recently installed is said to be the largest in the world. It is driven by electricity and will dig to a depth of 45 feet. The dredges are now operated in a temperature as low as 20 degrees below zero, but when it gets down to 30 and 40 degrees below zero it is impossible to keep the water open. A large power house is under construction on the Klondike River to furnish electric power for many of the dredges operating in that section. Two coal mines have also been put into operation which have materially cheapened the supply of power. In the White Horse district along the railway, important copper mines have recently been opened. The White Pass and Yukon Railway has built a spur track a distance of 10 miles to these mines.

Since the discovery of silver in the Cobalt district of Ontario in 1904, the mines in that district have shipped ore containing over 96,000,000 ounces of silver valued at upward of $48,000,000. Within the last year or two a gold mining district known as the Swastika has been discovered. This is located 165 miles north of North Bay, 31 miles north of the Cobalt silver district and 65 miles east of the recently discovered Porcupine gold district. The Swastika district is said to cover approximately eight square miles. It is covered with timber, adequate for the use of the mine. A railway has already been built and a station provided.

At Medicine Hat, which shares with Moose Jaw the doubtful honor of being the "weather factory" of the Northwest, is located one of the most important natural gas fields in America. Gas is now supplied for domestic use at 13½ cents per 1000 cubic feet and to manufactories at 5 cents per 1000 cubic feet. On this basis, it is estimated that heat, light and fuel for a ten-room house, for a year, will cost not to exceed $50.00. Electricity can be furnished by the use of natural gas for about $15.00 per H. P. per year, while similar power developed from Niagara Falls costs about $24 a year. In view of the cheapness of fuel, Medicine Hat is beginning to develop into an important manufacturing center. The two important industries at present are the Alberta Clay Products Company and the Alberta Rolling Mills Company.

Canada is now producing about 82 per cent of the world's supply of asbestos. The only rival of Canada as regards asbestos is Russia, but the Russian supply is not easily accessible to transportation. A large part of the Canadian asbestos is now being used for the manufacture of asbestos shingles, a new roofing material of great promise.

The Canadian Pacific Railway has begun work on the new line from Victoria Harbor, on Georgian Bay, to Montreal. The line is said to be one with no grades and practically no curves, and is the shortest possible line between the Great Lakes and salt water. The distance from Victoria Harbor to Montreal is 65 miles less than from Buffalo to New York. The construction of the Grand Trunk Pacific Railway is being pushed by the Canadian Government in the eastern provinces and it is thought that the portion through New Brunswick will be completed by 1912 so that trains can run from salt water to Levis, opposite Quebec. Owing to the collapse of the St. Lawrence bridge near Quebec a ferry will have to be used across the river until 1915.

A survey has been ordered for a tunnel under the Strait of Northumberland to connect Prince Edward Island with New Brunswick. The shortest distance is about seven miles, and the maximum depth of water is 90 feet. The cost is estimated at $15,000,000. Owing to the severe winters, regular navigation is closed from the middle of December to the

middle of April. During this period ice-breaking steamers are run but transportation rates are necessarily high, and at certain periods communication is altogether cut off. At times the mails are hauled across the strait on sleds. This interruption of transportation is keeping the island in an exceedingly backward stage. Agriculture is almost the sole industry and the surplus labor of the province is forced to migrate to the mainland. It is thought that if satisfactory transportation facilities are provided, manufactures can be established to employ this labor and furnish a better market for agricultural products.

As is well known, the Pacific terminus of the Grand Trunk Pacific Railway is to be at Prince Rupert, near the southern boundary of Alaska, that is to say, about 450 miles north of Vancouver. The Canadian Northern Railway is also building to the coast. Its terminus is to be Port Mann, which is situated on the Fraser river opposite New Westminister, and about 20 miles from Vancouver. The Canadian Northern Railway follows a more northerly route than the Canadian Pacific, with lower grades and less arid land. This is said to be the route originally selected for the Canadian Pacific. Both of these new lines are building westward from Central Canada and eastward from the Pacific coast, and there is intense rivalry as to which will be completed first. In addition there are several other lines under construction in Western Canada which will tend to revolutionize traffic conditions. One of these is to be built by the government in order to connect the western wheat fields with Port Nelson on Hudson Bay. It will probably be operated by the Canadian Northern. Lines are also building from North Battleford and Edmonton toward the Athabasca Landing in order to connect with the great northern waterway which extends to the Arctic Ocean. Another line is headed for the fertile Peace River Valley, where it is said that wheat has been grown for more than a century with very seldom a crop failure. This line also starts from North Battleford. The road from Edmonton to Athabasca Landing is already substantially complete.

The railway mileage of Canada is approximately 25,000. In 1910 the freight traffic in Canada amounted to approximately 75,000,000 tons, a gain of 7 6-10 million tons over 1909. The traffic on Canadian canals during 1910 amounted to 43,000,000 tons of which 87 per cent was eastward bound traffic. 84 per cent of the entire canal traffic passed through the Sault Ste. Marie Canal. The canal traffic for 1910 shows an increase of 9 2-10 million tons being 27½ per cent over 1909. As an indication of how rapidly Canadian canal traffic is increasing, the foregoing figures are significant.

The all water freight rate from the head of Lake Superior to Montreal on wheat is 3½ to 4½ cents per bushel while through New York it is 4

to 5 cents. In spite of this fact, there are certain conditions which operate against the St. Lawrence route and in favor of routes through the United States. In the first place the ships used in the grain trade on the Great Lakes are too large for the present Welland Canal, which is a fourteen foot waterway while the loaded vessels draw 21 feet. Secondly many of the lake boats are owned by railways operating between Buffalo and New York. Thirdly, the ocean rates out of New York are usually lower than from Montreal. This difference amounts to from ¾ of a cent to ½ cent per bushel. Fourth, the marine insurance on vessels sailing from New York and Boston is lower than for vessels using the St. Lawrence route. Fifth, vessels discharging cargo at Buffalo are usually able to obtain west bound cargo, chiefly coal, to the extent of something more than half their capacity while Montreal is unable to furnish return cargos to exceed 25 per cent of the vessel's capacity. At present 44 per cent of the Canadian wheat passes through the Soo Canal, is landed at Canadian ports on the Georgian Bay and is carried east by rail, chiefly to Montreal.

The new Conservative Cabinet in Canada is pledged to the project of a new Welland Canal and it is expected that actual construction work will begin next spring. The government engineers have reported in favor of the Jordan route which begins at Morgan's Point a few miles west of Port Colborne, and ends at Jordans Harbor. The new canal will have only two locks and the time of passage will be reduced to 5 or 6 hours, against double that by the present canal. The new canal will be large enough for ocean going vessels, and even warships. The new project is backed by the eastern provinces as an offset to the Hudson Bay route. In order to be effective, however, the St. Lawrence canals and river channel will have to be correspondingly deepened and this would seem to involve a prohibitive expense.

THE USE OF ARTIFICIAL LIGHT IN A SUB-ARCTIC REGION [1]

By PHILIP S. SMITH,
United States Geological Survey

TO most dwellers in the temperate zone the long summer day and the long winter night of arctic regions are facts of common hearsay knowledge. The absence of qualitative date, however leads to much uncertainty as to the real conditions, so that it is difficult to conjure up a mental picture of the amount of day-light enjoyed by people in these far-off regions.

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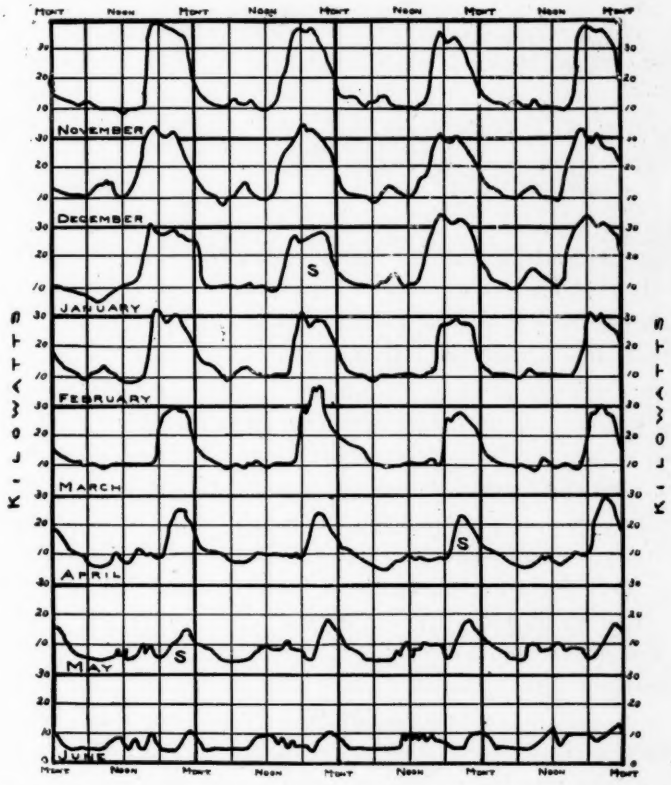
1. Read before the Association of American Geographers, Pittsburg meeting, 1910. Published by permission of the Director of the U. S. Geological Survey.

During the summer of 1910, while in Nome, Alaska, an opportunity was offered the writer of examining some of the records of one of the electric light and power companies of that town. The quantitative data afforded by these records showed in such graphic manner the effect of the annual change of the earth's relation to the sun that it gave one a clearer idea of the relative amount of light and darkness than is possible by mere verbal description.



2. The data for the accompanying illustration were furnished by Arthur Gibson, of Nome, to whom the writer is indebted for this and many other favors.

Nome is located on the shores of a coastal plain, in latitude 64° 30′ N. and so is a little more than 140 miles south of the Arctic Circle. It has a winter population of between 3000 and 4000 and a summer population of about twice that number. During the winter practically all the electric power is used for illumination, but during the summer a large part is used for power in running gold dredges. It is not possible, therefore, to give the precise amount of electricity used solely for illumination or to figure out the per capita consumption. The figures would show a greater difference between summer and winter consumption of electricity if the

population were equal throughout the year or if the same amount of power for other than illuminating purposes were used winter and summer.

Figure 1 is a graphic representation of the amount of electricity consumed during the first four days of each month from November, 1909, to June, 1910, inclusive. The diagram is so constructed that horizontal distance indicates hours. For simplicity, only four hours, viz. midnight, 6 A. M., noon, and 6 P. M., for each day have been definitely located on the diagram. Other hours may be approximated in the intervening spaces. The vertical distance between each line indicates spaces. The vertical distance between each line indicates 10 kilowatts. The amount of electricity used at any particular hour may be determined by noting the intersection of the curve with the line indicating the time. Due to the fact that there is a variable amount of electricity lost in transmission, the lower parts of the curves are less significant than the higher points.

Comparing the peaks of the curves it is seen that the maximum consumption for the four days given averages about 34 kilowatts in December against about 11 kilowatts in June. A progressive change from these two extremes can be traced; thus the average maximums used were 32 kilowatts in January, 31 in February and March, 25 in April, and 16 in May.

It is important however to consider not only the maxima, but also the *form* of the curves, especially during what may be called the evening period of darkness. Thus, in December the period of heavy consumption, denoting by that term the length of time when the consumption was twice that of the period of smallest consumption—is roughly nine hours in December, nine in January, seven in February, six in March, five and a half in April, five in May, and one in June. In December the curve begins to show a strong rise from about 1 to 1:30 P. M. and the consumption of electricity was twice that of the low period by 3 P. M., showing that the lights are nearly universally lighted about 2 o'clock in the afternoon. In January much the same condition prevails, but by February the days have become notably longer, as is shown by the fact that lights were not turned on until after 3, and it was about 4:30 before the consumption of electricity reached a point double the minimum. In March lights were not lighted until after 4:30 and it was 5:30 before they were extensively turned on. In April the days had increased so in length that the heavy load for evening did not begin until after 6 P. M. and did not amount to double the minimum load until nearly seven. This condition continued through May, until in June it is evident that it was 9 P. M. before light began to be turned on, and it was 10 o'clock before the period of heavy load was reached.

Not only was the amount of electricity supplied for lighting in the period of afternoon and evening darkness greater in the winter than the summer months, but in the former season there is the other, or morning,

period of darkness which exercises a control on the consumption that is not experienced in the spring months. Unfortunately, this is not as legible on the curves as might be wished, for the June curve is complicated by the use of power for other than illuminating purposes, and so there is a considerable rise in the consumption during the daytime. A more careful inspection of the curves, however, shows that the positions of high load are not analogous and therefore must be due to different causes.

The effect of the dark mornings may be well seen in the December and January curves. In these two months the early morning period of minimum consumption of electricity, due to the inhabitants being asleep, is succeeded, about 6:30 to 7 A. M., by the lighting up preparatory to breakfast. By 10 to 10:30 the morning maximum of illumination has been reached, and the curve gradually sinks to the noon minimum. It should be remembered, however, that at no time, even on the shortest day, is the sun entirely below the horizon all the time, so the noon period is practically one of smallest artificial illumination. The anomaly presented by the absence of the morning period of high load on the first two days of January is probably to be explained by the fact that the first of that month was a holiday and the second was a Sunday, and therefore the regular routine of the Nome people was interrupted and the usual breakfast preparations were suspended.

It will be seen that *during the winter there is the necessity for lights from about* 2 *in the afternoon until* 10:30 *or eleven in the morning, whereas, in the summer, lights are not needed before* 9 *or* 10 *o'clock in the evening, and by* 1 *or* 2 *o'clock in the morning the load is practically removed.* The fact that there is practically no electricity used early in the morning in the winter is due to the habits of the people rather than to the lack of need for illumination.

Many interesting personal habits are illustrated by the diagram, although few of these features merit more than passing attention, as they are not particularly characteristic of the people of sub-arctic regions. One of these traits is shown by the double-peaked character of the evening period of heavy load. The first of these peaks coming at about 6 o'clock seems to mark the supper period. This is followed by a short period of lessened artificial illumination, and then the curve again takes an upward trend and reaches a maximum between 8 and 9 P. M., which marks the period of visiting and receiving calls. This high may therefore be taken to represent the maximum of social activity. During April, May, and June, however, when artificial illumination is not necessary during supper, the curve of heavy evening load is single, showing only the "social" peak.

The November curve shows also the feature of the double breakfast period, one at about 6 probably being the workman's breakfast hour, and the other, from 8 to 9, being for the more leisurely classes. The

absence of this feature in the curves for the other winter months is attributed to the fact that after the country is frozen most of the early risers had gone out of town on prospecting trips and the town dwellers had settled down to the more leisurely customs imposed by a long period of darkness.

Owing to the fact that practically all the electricity used on Sundays is for illuminating purposes one could recognize the Sundays by the smaller consumption. This is not particularly well-shown on the diagram, for not a long enough period is represented. The January curve shows this feature best, for Sunday fell on the 2d, but the same thing is also recognizable in the curves for April and May in which months Sunday was on the 3d and 1st, respectively. No other Sundays are represented on the diagram.

SUMMER COURSES IN GEOGRAPHY

By F. E. WILLIAMS,
University of Wisconsin, Madison

THE following is an incomplete list of universities giving summer courses in geography. We have not succeeded up to date in securing the necessary information from all the universities to which we wrote, and some may have been overlooked in our inquiries. Many normal schools and normal colleges are offering summer courses.

UNIVERSITY OF CALIFORNIA, BERKELEY.

Commerce of the Pacific, San Francisco as a commercial port. Professor Wright.

Field Excursions, A teachers' course, Professor Wright.

UNIVERSITY OF CHICAGO.

Commercial Geography, Mr. Schockel.

Influence of Geography on American History, Associate Professor Barrows and Miss Lanier.

The Economic Geography of the United States, Associate Professor Goode.

Economic Geography of Europe, Associate Professor Goode.

The Natural Resources of the United States, their Exploitation and Conservation, Associate Professor Barrows.

Geographic Influence in the History of the Interior, Associate Professor Barrows.

Research Course; Advanced Work, Associate Professors Goode and Barrows.

The school of Education of Chicago University offers courses in:

Geography in the Primary Grades, Geography in the Grammar Grades, and Geography in the High School, by Associate Professor Baber.

Physiography, Professor Salisbury and Mr. Schockel, First term, Mr. Donnelly, Second term.

Geographic Geology, The origin, development, and destruction of geographic features, Professor Salisbury, First term, Professor Carney, Second term.

COLUMBIA UNIVERSITY, NEW YORK, N. Y.

The Teaching of Geography in Elementary Schools, Miss Kirchwey.

Continental Geography for Schools, Miss Kirchwey.

Physical Geography and its Economic Aspects, Professor D. W. Johnson and Mr. Wright.

Physiography of the Eastern United States, Professor D. W. Johnson and Mr. Wright.

CORNELL UNIVERSITY, ITHACA, N. Y.

Physical Geography, Professor Condra and Dr. von Engeln.

Physical Geography, Laboratory Course, Assistant Professor Bengston.

Physical Geography, Field Course, one afternoon each week, three Saturday excursions and two or three two-day voluntary excursions, Professor Condra and Assistant Professor Bengston.

Meteorology and Climatology, lectures, laboratory work, and field observations, Dr. W. M. Wilson.

Geography of North America, Professor Condra and Dr. von Engeln.

Industrial Geography, Professor Condra and Assistant Professor Bengston.

Aims and Methods in Geography, Assistant Professor Bengston.

Round Table Conference in Geography, Four or five evening conferences on the teaching of geography.

Excursions for Geography and Geology, Tramping trips—for men only, four or five trips of three or more days each; laboratory work on area covered, Dr. von Engeln.

DENISON UNIVERSITY, GRANVILLE, OHIO.

General Geography—physical and regional, Mr. Gregory.

Commercial Geography, Mr. Gregory.

UNIVERSITY OF ILLINOIS, URBANA.

Physiography Course for Teachers, Professor Cushing.

Advanced Physiography, Professor Cushing.

INDIANA UNIVERSITY, BLOOMINGTON, IND.

Physical Geography, Professor Cumings and Associate Professor Beede.

Conservation of Natural Resources, Professor Cumings.

UNIVERSITY OF IOWA, IOWA CITY.

Physiography, For high school teachers, Professor Trowbridge and Mr. Leighton.

UNIVERSITY OF MICHIGAN, ANN ARBOR.

Teachers' Course in Physiography, Mr. Scott.

UNIVERSITY OF MINNESOTA, MINNEAPOLIS.

Problems in Geography, Origin and effects of physiographic features, principles of meteorology and world's climate, Mr. Everly.

UNIVERSITY OF MISSOURI, COLUMBIA.

Physiography, For teachers, orgin and significance of the features of the earth's surface, Mr. Emerson.

Field Course, Geology and geography of an area in the Wind River Mountains, Mr. Branson.

UNIVERSITY OF NEBRASKA, LINCOLN.

Physical Geography, Leading physiographic processes etc., Assistant Professor Bengston, Mr. Filley, and Miss Griffith.

Industrial Geography, Natural resources and their conservation, Assistant and Professor Bengston, Mr. Filley, and Miss Griffith.

General Geography, Correlation of regional and physical geography designed for teachers, Miss Griffith.

Agricultural Geography of Nebraska, Mr. Filley.

NEW YORK UNIVERSITY, N. Y. CITY.

Geography, Deals with phases of advanced physical, commercial, and political geography; for teachers, Professor Woodman.

The Geography of Commerce and Industry, Professor Woodman.

General Physiography and Geology, Field work and discussions, Professor Woodman.

OBERLIN COLLEGE, OBERLIN, OHIO.

Field Geology, Geology and physiography of area in Virginia where New River cuts through the Appalachian Mountains, Professor Hubbard.

SUMMER SCHOOL OF THE SOUTH. UNIVERSITY OF TENNESSEE, KNOXVILLE.

Descriptive Geography, Dr. Millidge.

Geography of the Continents, Dr. Millidge.

Commercial and Industrial Geography of the United States, Dr. Holdsworth.

Commercial and Industrial Geography of Foreign Countries, Dr. Holdsworth.

UNIVERSITY OF VIRGINIA, CHARLOTTESVILLE.

Physical Geography, Professor Grasty.

Commercial Geography, Professor Grasty.

Primary and Grammar School Geography, For teachers, prepares for state examinations.

UNIVERSITY OF WASHINGTON, SEATTLE.

Professor Landes gives a "Traveling Course" including four weeks in Yellowstone Park, Primarily for the study of Geology.

THE UNIVERSITY OF WISCONSIN, MADISON.

Physical Geography, Subject matter and consideration of aims and methods, Associate Professor Whitbeck.

Commercial Geography, United States and other leading commercial nations, Associate Professor Whitbeck.

Summer Field Course in Physiography and Geology. Four weeks in August beginning after close of summer session, limited to 12 students (men). Study of various areas of southern Wisconsin,. Associate Professor Whitbeck.

PHYSIOGRAPHY IN THE HIGH SCHOOL

By E. E. RAMSEY,
Training High School, Bloomington, Ind.

FOR a year or more the writer has been engaged in an investigation concerning physiography in the high school. The study has been made through the medium of three questionnaries, one sent to high school teachers of physiography, another to high school students of the subject, and a third to teachers in normal schools, colleges and universities. The questions to high school teachers were sent to schools throughout the North Central States, while the normal school, college and university list was sent to representative schools of each group over the United States. The returns from both lists were very gratifying, those from the higher schools particularly so. The preliminary report upon the returns from the first and third of these lists has been published recently by School Science and Mathematics, (Vol. 11, 1911, December; Vol. 12, 1912, January and February.) A brief summary of a part of the material secured and a part of the conclusions drawn from the same source are given below.

Value of Geography. The following values are given most frequently by both lists of answers: In the high school list, the training of the observational powers is given most frequently. Such an answer, of course, presupposes laboratory and field work in order to realize such an end. Reasoning, as a value, follows in a perfectly logical way. Geography as an explanation of natural phenomena is mentioned often. Training in thinking "in a specific way" is noted in nine answers. Frequent mention of the informational side as a value is made. Five cite the usual relation of Physiography in the course of study to the geography work in the grades as a point distinctly in its favor. The college lists give essentially the same points and they are given with about the same relative frequency.

Adaptability of physiography to high school work. Eighty-eight per cent of the teachers reporting from secondary schools consider the subject to be the equal or the superior of any of the commonly recognized high school sciences. In the second list, 18 of the 21 reporting (86 per cent) consider the work adapted to high school students. Only one teacher marks the subject down in the ranking with the other sciences. It is thus clear that when conditions, which are the equal of those surrounding botany, zoology, physics, and chemistry, surround physiography, it becomes the most valuable science for secondary work.

Position of geography in the course. 57 per cent of the high schools reporting favor the subject in the freshman year; 21 per cent in the sophmore year; 8 per cent in the junior year; 10 per cent in the senior year. Leaving Indiana out of this tabulation, there is practically an unanimous opinion in favor of the *freshman year.* The arguments set forth for this position in the freshmman year are:

(1). Geography is a foundation and introductory science.

(2). The subject has a logical position here because of its connection with grade geography.

(3). Physiography deals with larger quantities than the other sciences and is therefore more fully adapted to freshman work.

College teachers agree that the introductory value warrants its position in the first year's work. The next two points mentioned above are brought out in the same order. Outside of one state canvassed, there is practically no argument raised favoring the work above the sophomore year.

The function of geography. Physiography is a basal and an introductory science; it deals with the larger phases of those forces and things dealt with more specifically by the sciences of geology, astronomy, zoology, botany, physics, and chemistry. The subject can, for the above reason, be made to serve the ends of a general science course without omitting anything from the present general science courses deserving the name of sciences and without losing anything due the physiography. Physiography in such a position and dealt with in such a way makes a rational basis for

the biological sciences both from the standpoint of subject matter and from that of laboratory and field training.

Viewpoint. Twenty-four out of 55 high school teachers reporting favor the geocentric view point; twenty-three favor the anthropocentric, while eight favor a co-ordinate presentation of the two views. Eight college teachers favor the latter view, six would emphasize the anthropocentric and five favor the geocentric. Combining the percentage results from each set, it is thus seen that each of the three views has almost exactly the same support.

Laboratory and field work. Physiography must be made a field and laboratory subject to a greater extent than it is at present in order that it may reach its maximum efficiency as a science. It is not putting the case too strongly to say that the old fashioned text-book work in physiography is scarcely worth the effort required to present it. The average time spent in laboratory work by the high schools reporting is less than two periods per week, while more than 50 per cent of them do no field work at all. Eighteen schools do more than one trip per year. The college reports present no agreement upon the amount of time that should be given to these two lines of work, but there is practically unanimous agreement that both phases must be recognized as component parts of a course in physiography. That the subject should be placed on a par with other secondary sciences in the matter of time alloted and in the matter of laboratory and field facilities is also pointed out as necessary.

Meteorology. The average amount of time given to meteorology by high schools is six weeks. The practical value of this phase of physiography, its bearing on all phases of the larger subject, and its unexcelled opportunities for laboratory and field work warrant the statement that it does not receive enough consideration. The answers from the college lists sustain this position by stating that at least three months' time should be given meteorology.

DRYER'S HIGH SCHOOL GEOGRAPHY—A NEW TYPE OF BOOK

FOR at least five years there has been a demand among educators, supported by many geographers, that high school geography be rationalized and humanized. A few schools, regardless of the lack of text-books and available teaching equipment, have, under the lead of enthusiastic teachers, modified and abbreviated the familiar course in physical geography. In many cases this new work has taken the form of commercial geography, sometimes with and sometimes without a basis in physical geography. A few have endeavored to introduce regional geography, based on the elements of physical geography, and giving a large amount of attention to economic and social conditions past and present.

Even in this utilitarian age the geography of commerce and industry is not the only usable phase of human geography for high school pupils, for every person who would make the best use of his mental training will find geography of assistance in the interpretation of history, in the study of all the distributive sciences as well as in economics.

Professor Dryer, in response to this ever growing demand of the times, has prepared a pioneer book in high school geography, of which the first two parts, entitled Physical Geography and Economic Geography, have recently appeared under a single cover. This will be followed by a section on Regional Geography in the near future.

While Professor Dryer has not gone as far as some would desire in reducing the space devoted strictly to physical geography, and has not included as many illustrative human responses as would be most helpful, he has done a great service in breaking a new path that others will soon follow. If the remaining part is of the same flavor as the portions which have already appeared, regional geography in high schools will be a possibility, for there will be a usable text of a type that any well prepared teacher can use with satisfaction.

A strong element in the volume is the "Economic Responses," which follow each large topic, so that the distinctly physical portion is not studied by the pupils under orders, or for the sake of some far distant utility. The close relationships which are shown between physical and economic conditions add interest to the subject, and make the method of procedure rational and attractive.

In some instances the author has so reduced the space given to topics that the treatment is dry and repelling, and, in some cases, confusing. Many illustrations are without natural scale, and some are poorly reproduced. A few diagrams are too advanced for the pupils by whom the book would naturally be used. On the whole, however, the illustrations are well selected and pertinent. The numerous maps add much to the workableness of the volume, though their insertion again emphasizes the great need of an American atlas for high school use—a need which must be met before the modern point of view in secondary school geography will ever be developed to the desired degree.

In spit of some weaknesses, incident to a first book from a new point of view, which will be corrected in later editions and serve as warnings to later rivals, the volume deserves a more than cordial welcome.

The author's previous experience in book work and long continued success as a teacher are reflected in this volume, which is not for the few specially trained teachers. It is a volume that will prove workable under average conditions, while it will be at the same time helpful to the best geography teachers.

R. E. D.

A SUMMER AT CORNELL

By LOUISE W. MEARS,
Peru, Nebraska

CORNELL, on the shores of beautiful Lake Cayuga, and the name of Ralph S. Tarr will always be associated. As in our recollections of the Lake Poets of England, or the Highland Scott, the mind clings to the place-association.

There is a fraternity of feeling among those persons who have sojourned a summer at Cornell and participated in the geography excursions. Every hilltop and glacial gorge has been made to contribute to the field courses that give physical expression to the book and the map.

The great modern geographer is one who can find and employ to the fullest extent the meaning of his immediate locality; and happy is the coincidence when he comes into a geographic paradise such as Cornell's eleven hundred acres of panoramic campus afford.

At Ithaca one seeks to read, as it were, the book of glaciology by beginning at the last pages, that is, the environmental evidence of an ice age. It is not strange that Professor Tarr should have sought the first pages of the story in the living glaciers of Alaska.

Last summer (1911) the geography department at Cornell conducted a series of field trips numbering more than seven all-day excursions and six half-day trips.* Not once did wind or weather interfere. In reviewing this series of remarkable excursions one recognizes the logical sequence, the clearness of each physical type, and the sense of proportion that characterized the course as a whole, shaping itself ideally to laboratory and lecture room work. Such a summer course in geography fulfills the conditions that geographers are striving for today—an acquaintance with the real earth.

THE SUMMER SCHOOL OF THE SOUTH

ABOUT ten years ago, the great Southern Summer School began at the University of Tennessee in Knoxville. More than 2000 people, mostly teachers, enrolled that summer. Still larger numbers have been enrolled since. The editor of this magazine had the pleasure of being connected with the first session of the school. It was a delightful and valuable experience. A considerable number of southern teachers attend northern summer schools and we find them to be charming people. But, to spend five or six weeks among them, to make friendships, to learn of the heroic work which they are carrying on, to get the inspiration of their

*These excursions were conducted by Prof. George E. Condra of Nebraska University and Dr. John Rich, now of the University of Illinois.

enthusiasm, is a liberal education. There are many ways of using the summer vacation profitably, but, since his experience in Knoxville, the writer has maintained that every northern teacher ought to spend a part of one of these vacations among the southern teachers in the Summer School of the South. There is a wide variety of regular courses and many courses of lectures by the most eminent educators in the country. But it is not the formal instruction that will prove the greatest benefit; it is the mingling with the southern people, the broadening of sympathies and of interests, the gaining of first-hand knowledge regarding southern conditions, and a lot of other worth-while experiences, that will make the six weeks memorable. Yes, it is warm in Knoxville. Sometimes it is hot. So, also, is it in Chicago, Ithaca, Madison and New York. Maybe Knoxville is warmer than any of these places, yet the average temperature is by no means higher than that of many of the days in northern cities. Our feeling is that a northern teacher can afford to take his chances on temperature for the good the experience will do him.

R. H. W.

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THE regular summer session at the University of Wisconsin begins June 24 and ends August 2nd, (Friday). On the following Monday a field party of not to exceed twelve (men) will form a camp at Devils Lake in the Baraboo Ranges of south-central Wisconsin and devote about a month to the study of the geology, physiography and geography of the region. The Baraboo Ranges are mountains of great antiquity. They have passed through change after change through the ages, but they carry the marks of these changes and the unraveling of the story is a valuable geological exercise. Part of the region lies in the driftless area and part in the drift-covered area, and this condition makes comparative studies impressive. On the west is a region sculptured by the weather and the streams and presenting an erosion topography, pure and simple. To the east is a region originally like the one on the west, but now much changed by the work of the glaciers. The glacial studies along the terminal moraine and in the drift covered territory, the erosion studies in the driftless area, the structural and other geologic studies in the old mountain folds, will constitute the main features of the work. The fee for instruction is $15.00, and the field expenses are estimated at $45.00, making a total of $60.00. The work will be directed by Associate Professor R. H. Whitbeck of the University of Wisconsin.

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6. What cities owe their importance to the presence of these passes?
7. Locate the chief lowlands of Europe.
8. What countries occupy the lowland plain of Central Europe?
9. What rivers draining the central plain flow to the North Sea? the Mediterranean? the Black Sea? the Caspian Sea?
10. Compare the advantages of these streams as routes of trade.
11. Name cities which owe their importance to their location on these streams.
12. What countries of Europe produce more cereals than they need for their own use?
13. How do the surface features of these countries influence their production of cereals?
14. From what ports and by what routes do these countries send away food?
15. What countries import large quantities of food?
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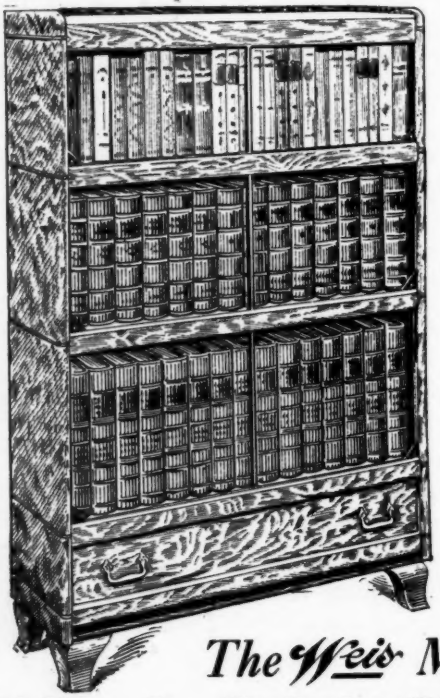

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Of the Department of Geology and Geography of the University of Wisconsin

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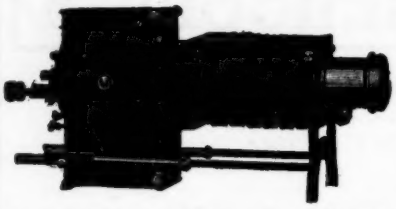

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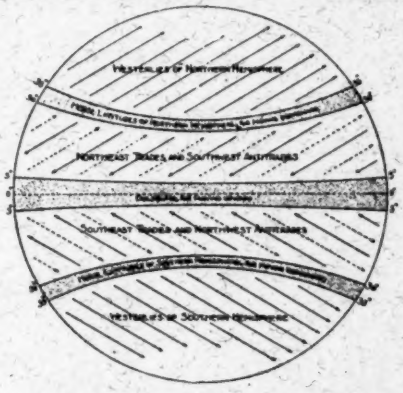

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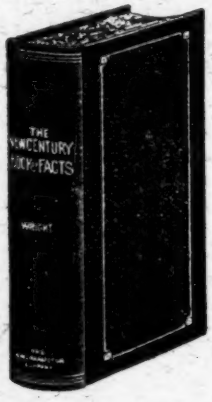

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